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EXAMINER

FERNANDEZ, K

ART UNIT

PAPER NUMBER

2881

DATE MAILED:

08/15/01

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

**Commissioner of Patents and Trademarks**

# Office Action Summary

Application No.

09/629,022

Applicant(s)

DO ET AL.

Examiner

Kalimah Fernandez

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 01 June 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

**DETAILED ACTION*****Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 6-8, 17-19 and 25-27 recites the limitation "the detector(s)". There is insufficient antecedent basis for this limitation in the claim. Since, applicant recites a number of detectors, failure to specifically point out which detector(s) he means violates 112, second paragraph. Appropriate corrections are required.

***Claim Rejections - 35 USC § 103***

3. Claims 1-4,9-15, and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No 6114695 issued to Todokoro et al and in view of US Pat 60753373 issued to Iino. Todokoro teaches the claimed invention except for the use of x-y-z stage. Specifically, the limitations of claim are evaluated in the following table:

| Instant claimed limitation   | Where to find in Todokoro '695        |
|--|---------------------------------------|
| Electron source (of claims 1, 12, and 20)                                | Col.1, lines 49-53; col.14, lines 3-8 |
| Focusing device (of claims 1,12, and 20)                                 | Col.14, lines 15-22; Fig. 18          |
| Focusing the e-beam to a first focus depth and second depth (of claim 1) | Col.3, lines 55-59                    |

|   |                                       |
|---|---------------------------------------|
| Movable support in a transverse direction (in claims 2,13, and 21)        | Col.14, lines 31-45                   |
| Support aligned with axis of e-beam (in claims 3,14 and 22)               | See figure 16-18; col.4, lines 40-42  |
| Two detector spaced apart from the support ( in claims 4,15 and 23)       | See fig. 17; col.13, lines 50-67      |
| Port surface (i.e. aperture) (in claim 12)                                | See fig. 18, reference numerical (36) |
| Focusing at first depth then changing focus to second depth (of claim 11) | Col.5, lines 3-7                      |

1. The differences between Todokoro and instant claimed invention are: 1) x-y-z support stage in claim 1; 2) two electron sources and focus devices as in claims 9,12 and 20.
2. Turning to the teaching of a x-y-z stage, lino is relied upon to illustrate that x-y-z stages are common in the art. Moreover, it is general knowledge in the art that x-y and x-y-z stages can be used in a scanning electron microscope as taught by Todokoro, therefore the selection of either falls within the level of ordinary skill. Finally, it is deemed that claimed invention is an obvious variant of Todokoro's invention, since x-y and x-y-z are art-recognized equivalents.
3. In regards to the recitation of two electron sources and corresponding focusing devices, it has been held that mere duplication of the essential working parts of a device

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involves only routine skill in the art. Seeing the recited limitation involves such a mere duplication, the claimed invention is not patently distinguishable over the cited prior art.

4. Claims 5-8, 16-19, and 24-27, to extent as taught and understood, are rejected under 35 U.S.C. 103(a) as being unpatentable over Todokoro and "The S-800 CD-Measurement SEM and Application," *Hitachi Scientific Instruction Technical Data-SEM*, No. 67, front cover, back cover, 1995, submitted by applicant. The cited prior art clearly shows that the use of optical microscope as in the claimed invention was not only known, but in the art at the time this invention was made. Furthermore, it is easily reasoned that one of ordinary skill in the art would have found motivation to incorporate the optical microscope into Todokoro's apparatus, since Todokoro teaches an alignment step by optical means (see col.16, lines 21-37).

5. In regards to the limitations: 1) memory device; 2) display; and 3) printing device. Todokoro teaches a means to acquire an image utilizing a memory device, display and printing device as illustrated by fig. 45a thru fig.47. However, Todokoro does not teach a coupling of such devices to signals detected by an optical microscope.

6. It is held that Todokoro's teachings of monitoring scanning position data along with secondary/reflected electron signals, in order to generate a graphically representation of the signals collected as a function of the movement/scanning of the stage, is reads on the recited limitations (col.47, line 44- col.48, line 11). Namely, Todokoro's invention performs the same function of claimed invention, without the optical microscope. In addition, applicant has failed to demonstrate any criticality or non-obvious reasoning for acquiring an image via optical microscope data as claimed,

instead of scanning and stage position data as taught by Todokoro. Therefore, it is deemed that the addition of an optical microscope does not render the claimed invention patentable over the cited prior art.

7. Moreover, the results are the same using either method and since both methods were known at the time of the invention (see s-8000 series article), the substitution of one known method over another has no criticality to one of ordinary skill.

### ***Response to Arguments***

8. Applicant's arguments filed 6/1/01 have been fully considered but they are not persuasive.

9. Applicant asserts the major issue that distinguishes the claimed invention from Todokoro is that Todokoro teach the detection of particle, which may pass through some portion of the semiconductor device. It is noted that applicant does not claim the detection of secondary or reflected electron, which have penetrated the semiconductor device, however nor applicant does exclude such detection. As pursuant to proper claim interpretation, claims are given the broadest reasonable scope, therefore the recitation of "a first detector spaced apart from the support to receive a first flow of electrons from the semiconductor device" does not limit the claimed invention as advanced.

10. Furthermore, the amended limitation "form at least one representation of the semiconductor device corresponding to electrons focused at the first and second depths of focus and impinging on one or more surfaces of the semiconductor device" does not rendered claimed invention patently distinguishable from the cited prior art. Since,

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Todokoro's invention directs the primary electron beam at the surfaces of the device (see figures 4, 9, 27b and 37; also see col. 23, lines 33-55).

11. In addition, in the light of applicant's specification, one of the objectives of the claimed invention is to inspect semiconductor devices that "either project upward from the surface of the wafer or form depressions or concavities in the surfaces of the wafer" (see page 1, lines 9-14 of spec.). Therefore, it appears to be contradictory to now argue that applicant's invention does not intend to analyze any secondary or reflected, which as passes through the semiconductor, simply because this would be impossible. It is, further, evident that in order to inspect the surface of depressions or concavities, some secondary electrons will be caused to penetrate the sidewalls of the depression.

12. Applicant, also, recites the capability to "measure a height or a depth of the semiconductor device feature by analyzing signals reflected by or emitted from semiconductor" (page 3, lines 26-30 of spec.). This recitation, further, compounds the inconsistencies between the actual claimed invention and argument advanced by the applicant.

13. Moreover, if applicant intends to exclude the detection of particle, which penetrate the sidewalls of depressions, this should be clearly stated in the claims and applicant's disclosure should describe in sufficient detail as to enable an ordinary artisan to accomplish such an achievement. As claimed and disclosed in the specification, applicant's arguments have no validity.

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**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kalimah Fernandez whose telephone number is 703-305-6310. The examiner can normally be reached on Mon-Fri between 7:00am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Teresa Arroyo can be reached on 703-308-4782. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

kf  
July 31, 2001

  
TERESA M. ARROYO  
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